

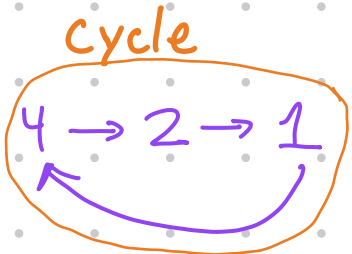
4 October 2024

Collatz function:

$$C(n) = \begin{cases} 3n+1 & \text{if } n \text{ odd} \\ \frac{n}{2} & \text{if } n \text{ even.} \end{cases}$$

Examples:  $C(5) = 16$ ,  $C(200) = 100$ ,  
 $C(31) = 94$

Iterate  $C(n)$ .

$5 \rightarrow C(5) = 16 \rightarrow C(16) = 8 \rightarrow$  

---

What do you observe?

What do you wonder?

---

Collatz Conjecture: The sequence of iterates, for any starting value, eventually reaches 1.

## A good mathematical question satisfies four characteristics:

1. The question is interesting to you.
2. You don't already know the answer to the question.
3. You haven't already seen the question before, or at least not exactly.
4. You can begin to make computational investigations to shed light on the question.

Height of a Collatz sequence:

The maximum value that  
occurs in the sequence.

↳ "trajectory"